Restricted

NAVY DEPARTMENT

BUMED NEWS LETTER

a digest of timely information

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Vol. 2 Friday, December 10, 1943 No. 12

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War Injuries of the Chest: The early mortality from thoracic wounds inflicted by high-explosive missiles is very great. The importance of intelligent management of such injuries cannot be too urgently stressed.

Examination of the dead on the battlefield has shown that approximately 33 per cent died of thoracic injuries. Hoche has shown that while among the 11 million American, English, French and German soldiers wounded in World War I only 6 per cent suffered from wounds of the thorax, the mortality from such wounds was 56 per cent. The mortality from chest wounds was second only to that from wounds of the abdomen of which 68 per cent were fatal. The mortality from all wounds was 8 per cent.

Trueta has shown that in the recent Civil War in Spain among 9,850 patients treated in the hospitals of Barcelona, 12.1 per cent had thoracic injuries. Crafoord states that wounds of the chest are still responsible for 30-40 per cent of all war fatalities.

Chest wounds incurred in naval warfare are characterized by their great extent, their multiplicity and the frequency with which secondary as well as primary missiles and pieces of clothing are driven into the tissues. Infection may be expected in all of them.

Chest wounds present not only the usual problems incident to extensive soft-tissue trauma but also the special problems that arise out of the violation of the anatomical and functional integrity of the cardio-respiratory mechanism. The importance of the early recognition of these special problems is emphasized by the frequent necessity for carrying out measures to correct the disturbed cardio-respiratory mechanism before attempting to combat or overcome shock. This is particularly true when shock is due not to hemorrhage but to instability of the mediastinum or the chest wall. Under such circumstances relief of shock can be accomplished only by surgical correction of the condition that has initiated and is maintaining it.

An attempt to reduce the mortality rate among men wounded in the chest must be made within the combat zone. This does not mean indiscriminate application of heroic measures in advanced surgical stations. In fact, the adoption of such a policy would most likely increase the mortality rate, as many of the seriously wounded will die despite any form of treatment, while hasty intervention will, in itself, prove fatal to men who might survive under conservative handling. What is needed is more accurate appraisal of the individual patient, with prompt first-aid control of certain complications of thoracic wounds. Following proper first-aid treatment, definitive measures are carried out with due regard to certain special aspects of thoracic wounds that set them apart from wounds of the head, abdomen or extremities.

General Principles: In handling injuries of the chest one should remove, widely and very gently, the clothing over the chest so as to obtain adequate exposure for thorough examination. An attempt should be made promptly to restore the normal relationships of the intrathoracic organs, as a disturbance in their relationships may in itself be largely responsible for shock. Therefore, open chest wounds should be covered and an effort made to control pneumothorax and/or cardiac tamponade. Immediate attention should be given to hemorrhage and to shock. The injured individual should not ordinarily be moved until he can be transported to a place where hospital care may be administered. One should watch constantly for further accumulation of air and fluid in the pleural or pericardial cavities. The cough reflexes must not be abolished by injudicious

sedation. The bronchial tree must be kept free of blood and secretions. When there is painful or paradoxical movement, the chest wall should be supported.

An effort should be made to minimize infection, which is the direct or indirect cause of practically all late morbidity and mortality. A reasonably high blood sulfonamide level should be established at once. Sulfadiazine, in dosage sufficient to achieve a level of 8 to 10 mg. per cent, is the drug of choice, and it is best administered in the form of its sodium salt, intravenously.

When an individual with a thoracic injury also has multiple injuries of other parts of the body, precedence should be given to treatment of the chest wound. Attention to thoracic surgery should be preceded only by the control of hemorrhage. In combined thoracico-abdominal wounds every attempt must be made to improve the thoracic physiology in order that abdominal exploration may be undertaken promptly. When operations of the thorax are indicated, positive pressure anesthesia should be employed.

Physiopathologic Effects of Unilateral Pneumothorax in the Normal Chest: In this condition there is an increase in the intrathoracic pressure on the contralateral as well as on the homolateral side. The pulmonary volume is decreased, and consequently the vital capacity is lowered. There may be paradoxical respiration ("Pendelluft" of Brauer). There is an elevation of venous pressure secondary to the increase of intrapleural pressure. The return flow of blood to the heart is diminished, resulting in a decreased systolic output and a consequent fall of the systemic blood pressure.

Injuries Requiring Conservative Care: An example is thoracic concussion (commotio thoracis). This condition may result from a non-penetrating chest injury (for example, that caused by an exploding shell), and a condition is produced similar to cerebral concussion. Autopsies on fatal cases have not demonstrated an anatomical explanation of the cause of death. It is possible that vasomotor reflexes similar to those in shock may be factors. The signs and symptoms of thoracic concussion are general pallor; cold, clammy skin; fast, weak and irregular pulse; shallow respirations which may be uneven or sighing; and often stupor or unconsciousness.

The patient should be treated for shock and oxygen administered. If a patient in this condition survives for a few minutes, he will usually recover.

Other Complications and Sequelae:

I. Traumatic atelectasis and pneumonitis: The atelectasis is the result of impairment in efficiency of the cough mechanism with retention of bronchial secretions. Any of the following conditions may contribute to its production: (a) voluntary splinting of the chest wall; (b) paradoxical movement of the chest

wall; (c) oversedation; (d) and prolonged unconsciousness. Hypoventilation of the lungs may be produced by keeping the patient in one position. Pulmonary hemorrhage may actually plug a bronchus and so directly cause atelectasis.

Diagnosis: One is led to suspect atelectasis when retained secretions are detected by the finding of coarse rales over the trachea and bronchi. When atelectasis and pneumonitis are present, the characteristic physical findings in the chest are usually accompanied by cyanosis, fever and dyspnea. A characteristic X-ray will often clinch the diagnosis. After securing proper support of the chest by strapping and shot bags, prophylaxis consists in encouraging coughing, judicious sedation, turning the patient from side to side, the administration of 10 per cent CO_2, the use of other expectorants and hyperventilation.

II. Mediastinal Emphysema: This condition is caused by the rupture of the bronchus in or near the mediastinum or the rupture of the bronchus deep within the lung with extension of air along the peribronchial tissues.

Subcutaneous emphysema usually first appears in the episternal notch but may spread extensively under the skin of the head, trunk and extremities. There may be dysphagia, dyspnea, cyanosis, pneumatic extrapericardial tamponade, distention of the neck veins and finally circulatory failure. The treatment should be palliative. A transverse incision may be made at the suprasternal notch through the platysma and a catheter inserted for drainage. Open thoracotomy may be necessary to attack the condition at its source.

III. Subcutaneous emphysema may follow either penetrating or non-penetrating bronchial communication between torn lung and subcutaneous tissue.

IV. Miscellaneous: Acute dilatation of the stomach may occur. Paralytic ileus may be present. The diaphragm may rupture with herniation of the abdominal contents into the chest cavity. (In this case repair should be postponed until later during convalescence) (J.C.D.)

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The Electro-Encephalogram in Concussion: Harris et al find that concussion is frequently followed by the appearance of abnormal electro-encephalographic wave forms during hyperventilation of the patient. Thus, in concussion with lack of neurologic evidence, the electro-encephalogram during hyperventilation may provide a sensitive sign of cerebral damage. The return of the pattern to normal represents a valuable prognostic sign and can aid in determining the point at which hospital care can be discontinued. (War Med., Oct. '43.)

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Pain after Amputation and Its Treatment: Incapacitating pain after amputation may be due either to irritation of end-bulb neuromata in the stump or, in the case of a phantom limb with persistence of pain and postural sensations, to pain projection from the sensory areas of the cerebral cortex.

Local pain, burning, and tenderness which are confined to the actual stump can be relieved by chemical or surgical interruption of the regional sympathetic outflow or by section of the spinothalamic tract (cordotomy). When resection of the regional sympathetic ganglia is contemplated, it is always wise before going ahead to test the effect of procaine block of the regional sympathetic ganglia by paravertebral injection of the first and second thoracic ganglia in a painful stump of the upper extremity, or of the second and third lumbar ganglia for similar conditions in the leg. If pain is relieved for several hours, resection of the sympathetic ganglia should give permanent results. Often the effects of procaine alone last for many hours or days. In this event two or three repeated injections are likely to result in final lasting improvement. These relatively minor and non-mutilating procedures are effective in an encouraging proportion of cases, especially when vasoconstriction and sweating are present to an abnormal degree. Only when complete paralysis of vasoconstriction and sweating indicates an effective procaine block without relief of pain should this simple and conservative procedure not be tried. Under these circumstances recourse must usually be had to cordotomy.

The peculiar pain and unpleasant postural sensations of the phantom limb will also often respond to sympathectomy or cordotomy, especially if the operation is performed at an early date; but these procedures invariably fail when the personality has started to deteriorate from prolonged suffering, introspection and morphine addiction.

In treating difficult problems of this sort it must always be borne in mind that any ineffectual and mutilating procedure, by adding another psychic trauma must inevitably result in further suffering and loss of morale.

Experience has taught that a single resection of a neuroma is justifiable if it is definitely tender and the pain can be relieved by infiltration of procaine hydrochloride. Repeated excision of neuromata, neurectomy, reamputation at higher levels, and resection of posterior spinal roots consistently fail and shoul never be used.

In the most severe forms of phantom limb pain, where in the past patients have sunk into hopeless invalidism, becoming morphine addicts or suicides, experience is beginning to show that it may be possible to obtain relief by new types of surgical intervention directed at the highest centers of the brain. These comprise resection of the contralateral post-central sensory convolution, from which the phantom sensations appear to be projected, or bilateral

division of the frontal association fibers, which may be effective by freeing the patient of his intense introspection and anxiety. At present both must be regarded as purely experimental procedures, which will require extensive investigation before their therapeutic value can be estimated. (J.C.W.)

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Preparation of Sodium Salicylate Solution for Intravenous Use: A solution of 1 per cent sodium salicylate suitable for intravenous use can be made by the addition of 10 grams of U.S.P. sodium salicylate powder to 1 liter of physiological saline (0.9 per cent) and sterilized by autoclaving. This material keeps satisfactorily. If exposed to bright light, a yellow discoloration develops. This, however, does not appear to modify the effectiveness of the solution or to make it toxic.

Sodium salicylate administered too rapidly may cause nausea and vomiting. If pyrexia or chill develops, other possible causes should be investigated. (A.F.C.) (Addendum to "Salicylate Therapy in Rheumatic Fever; A Rational Approach," Bumed News Letter, Vol. 2, No. 10, Nov. 12, '43.)

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The Phosphatase Test for Pasteurization of Milk was outlined in the Bumed News Letter of November 12, 1943. Chemicals for reagents, both in tablet and in bulk forms are obtainable also from the Applied Research Institute, 15 West 34th Street, New York, New York.

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The "Dangerous Streptococcus Carrier": There is no consensus on the proper isolation period for streptococcal respiratory tract infections. It is customary, at present, to isolate patients with scarlet fever for three weeks and not to isolate individuals with streptococcus throat infections who fail to develop an erythematous rash. This difference in management persists, although it is well recognized that both groups of patients may be infected with identical strains of hemolytic streptococcus, the only differences being the host's skin sensitivity to erythrogenic toxin and perhaps the amount of toxin produced in vivo. It is also recognized that a large percentage of patients of both groups carry hemolytic streptococci in the throat flora for several weeks after recovery without giving rise to return cases.

On the other hand, certain individuals become dangerous carriers, harboring highly communicable microorganisms in their respiratory passages. These individuals seem, as they go from place to place, to leave a trail of streptococcus infections behind them. On discharge from the hospital they may infect other men in their barracks; when admitted to a clean surgical ward, cases of scarlet fever,

tonsillitis or other streptococcus infection will develop among the other patients. If put to work in the galley, an outbreak of streptococcus sore throat may develop among those partaking of the food.

A recent intensive study of two such cases revealed the following findings: Both of them had apparently recovered from their acute infections but had failed to regain weight lost during their febrile illness. Both had X-ray changes in the maxillary sinuses and in the bronchial tree, indicating persistent infection. Both had a non-productive, hacking cough. Both had normal-appearing throats, the flora of which included a few colonies of (Type 19) hemolytic streptococcus. Both spread contagion until three months after the onset of their disease, when abnormal findings in the sinuses and lungs disappeared. Both had subacute respiratory tract diseases and remained dangerous carriers until their infectious processes had subsided. Studies of many such individuals suggest that the acquisition of communicability is closely associated with the presence of a mildly active morbid process.

The following hypothesis is presented as a possible explanation: The genesis of streptococcal respiratory epidemics is determined by the capacity of the bacterium to reproduce rapidly in the presence of the inhibitory substances of the human nasopharynx. The acquisition of this function by the bacterial cell is conditioned by the interaction of the infected host and the microorganism. If either the host or the respiratory pathogen establishes its supremacy with dispatch, it is unlikely that this function will develop. If, however, the host is unable to terminate the disease process and the bacterium is unable to extend its invasion, a series of changes may occur in the bacterial cell. Under these conditions of continued, mild, subacute disease the microorganism is forced to adapt itself to the immune forces of the host in order to maintain its activity. In making these adaptations to the host's factors of resistance, the microorganism must give rise to bacterial cells endowed with the capacity to multiply in the presence of the inhibitory substances of the nasopharynx. The acquisition of this function by these cells permits them to multiply when transmitted to a new host. These cells have thereby acquired communicability; they are "host-fast." This acquisition is not permanent; it is soon lost in the newly infected host and is also lost in the host spreading contagion as soon as the peculiar interaction ceases. (A.F.C.)

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Medical Officer Inquiries Regarding Problems in Sanitation Encountered on Independent Duty: A member of the Medical Corps recently returned from one of the outlying theaters of war inquired as to where medical officers, especially those on independent duty, might write for information concerning practical aspects of problems in sanitation, ventilation, purification of water, etc. The Bureau will be glad to receive inquiries on general or specific problems encountered by medical officers.

Sulfonamides and Dysentery Carriers: A number of papers have appeared recently in British and American journals reporting favorably on the use of sulfaguanidine and sulfasuxidine in the treatment of bacillary dysentery carriers.

Hoagland, Harris and Raile (War Medicine, October 1943.) gave sulfaguanidine to 30 and sulfasuxidine to 15 carriers of S. paradysenteriae. Twenty grams were given daily for six days divided into four doses between 8 a.m. and 8 p.m. While all of the individuals had had positive cultures before administration of the drug, 503 cultures (5 to 9 in each individual) on SS agar or desoxycholate-citrate agar examined after treatment were negative.

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While these drugs in the hands of other investigators have not always given, as in this series, 100-per-cent results, termination of the carrier state has occurred with sufficient frequency to establish the use of these drugs in this condition as highly effective.

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Most workers agree that when material is collected for culture directly from the rectal wall, a relatively greater number of positive cultures will be obtained than when a voluntarily passed stool is used.

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Hardy, Watt and DeCapito of the U.S. Public Health Service have described a simple method of obtaining cultures by direct application of a swab to the rectal wall in situations where large numbers of patients must be examined and proctoscopes are not available. They insert a dry swab contained within the lumen of a small lubricated rubber tube. The necessary materials are inexpensive and readily available. Gum rubber tubing (0.5 cm. inside and 0.8 cm. outside diameter) is purchased in bulk and cut into 12 cm. lengths. One end is beveled for about 1 cm. Cotton swabs are prepared on the usual wooden applicators, but the cotton must be wound tightly and the end covered completely. It must pass readily into the lumen of the tube. For use the swab is placed in the rubber tube with its tip slightly short of the beginning of the beveled opening. The external surface of this end of the tube is lubricated. The jelly should not reach the swab nor cover the opening. With the patient in a convenient position the unit is very easily inserted past the sphincter and up about one-half the length of the tube. The swab is exposed by withdrawing the tube 2 to 3 cm. The specimen is collected by rotating the applicator while sweeping it in a circular motion. The swab is then drawn back into the tube and in this position removed from the patient. The rubber tube and swab are separated and the latter is

immediately used for culture. Later the tubes are boiled, washed, sterilized, and stored for future use. One precaution must be observed in collecting specimens from individuals with a watery diarrhea: the rubber tube must be compressed between the fingers to prevent an undesired discharge of fecal material. Rectal swabs are convenient for hospitalized cases and have been used for the study of men in military barracks. (Pub. Health Rep., Apr. 10, '42.)

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Comparative Effectiveness in Bacillary Dysentery of the Different Sulfonamide Compounds: Hardy and Watt of the U.S. Public Health Service have been conducting clinical experiments designed to evaluate the relative efficacy of the various sulfonamide compounds in bacillary dysentery. Dr. Hardy summarized their conclusions as follows in a letter to Dr. Henry E. Meleney, Chairman of the Committee on Tropical Diseases of the National Research Council:

"Up to the present time over 1,500 individuals known to be infected with Shigella (Flexner, Sonné or Schmitz) when treatment was started have been studied. In all, ten sulfonamides were used. The major observations were these:

"All sulfonamides had some influence in cutting short the duration of these infections.

"Flexner strains responded promptly (with very rare exceptions), Schmitz infection was slightly more resistant, while Sonné cases and carriers cleared least satisfactorily.

"The poorly absorbed sulfonamides, though given in larger doses, had no demonstrable superiority in effectiveness in Flexner or Schmitz infections. The response was less satisfactory in one regard. The interval between the beginning of medication and a clinical or bacteriological response was longer with the poorly absorbed than with absorbed preparations. In the most resistant Sonne infections, with few exceptions, heavy infections were reduced to light ones by absorbed sulfonamides, but a small proportion of the cases continued positive, though excreting reduced numbers of organisms. One of the poorly absorbed compounds (sulfasuxidine) was regularly effective in giving a complete clearing of this infection as indicated by cultural tests.

"Toxic reactions were rare (not observed with poorly absorbed sulfonamides) as would be expected with treatment usually terminating in seven days or less.

"Cases and carriers responded equally well to chemotherapy.

"Concerning the choice of sulfonamides there need by no rigid rules. Sulfanilamide or sulfapyridine would not be recommended. Other absorbed sulfonamides (sulfapyrazine, sulfadiazine, sulfamethazine, sulfamerazine and sulfathiazole) would be acceptable. The first appears to have slightly superior properties, the last to be a little less effective and a little more toxic. Among the poorly absorbed compounds, we regard sulfasuxidine as superior to sulfaguanidine, and reserve judgment on 'sulfathaladine'.

"We recommend, therefore, that the treatment of Shigellosis (cases or carriers) begin with an absorbed sulfonamide. Follow-up culture should be taken not later than the fourth and again on the sixth day of treatment. If these or any subsequent two cultures are negative, the individual may be released. If they are positive and particularly if the organism is 'Sonné', a change to sulfasuxidine would be desirable. When cultures cannot be obtained a treatment of five days for Flexner and Schmitz and of seven days for Sonné is recommended.

"The dosage for adults for all absorbed sulfonamides was one gram four times daily; of sulfaguanidine and 'sulfasuxidine', 5 grams; and of 'sulfathaladine', 2.5 grams four times daily. Double these amounts was given as the initial dose. Children (between 25 and 75 pounds) received one-half the adult dosage; infants,.065 Gm. of absorbed sulfonamide per pound of body weight per day and proportionately larger amounts of the poorly absorbed compounds."

In our experience, sulfadiazine given in one-fifth the dosage was more effective than sulfaguanidine.

Our observations have been obtained in the study of institutional inmates. The nutritional status and general condition of the patients is less favorable than in military practice. Despite this difference it is our opinion that our findings on the relative efficacy of the different sulfonamides will hold true for members of the armed forces.

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Malaria and Blood Transfusion: The following paragraph is quoted from a paper by Stalker reporting his experiences in a U.S. Army Field Hospital located in the tropics:

"A number of battle casualty victims will require transfusions of whole blood. In these cases there is considerable risk of transmitting infection from donor to recipient in the process. It is frequently impossible to procure donors who have not been exposed to the risk of malarial infection. Therefore, in selecting the donor the following points should be considered: (1) Donors should be selected from individuals who have not had clinical evidence of malaria. (2) A thick smear of the donor's blood should show no malaria parasites.

(3) The donor aside from being physically fit should not have an enlarged spleen. Even if these considerations are satisfied, it must be assumed that the donors are potentially infected and when feasible, 0.6 Gm. of quinine should be taken by the donor six hours before the transfusion. After the patient has received the blood, quinine in treatment dose, as above, is given as soon as the patient's condition permits. Malaria transmitted by transfused blood is unlikely to give rise to fever until at least eight days have elapsed. Any malarial fever developing during the first week is probably due to infection acquired prior to transfusion. In passing one should not forget to observe the donors, as removal of blood from donors who have latent or suppressive malaria may, after a short interval, precipitate an attack of the disease." (Am. J. Surg., Nov. '43.)

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Relapse in Quartan and Benign Tertian Malaria: "Balanced against the favorable features of the benign type is its baffling tendency to repeated relapse, and the apparent reluctance of the body to make an immunological response to the infection. Thus, in spite of several successive and excellent courses of treatment, each time with apparent 'cure', this type of malaria will continue to relapse at intervals. The infection may thus reappear as many as six, eight, or ten times, or even more.

"When relapse occurs the medical officer is prone to conclude that in his previous treatment he has not given enough of his drugs, so, often in exasperation, he gives more and more. But though he may increase his dosage schedule tremendously, and extend it over a long period, a certain proportion of these cases will continue to relapse. The physician and the patient have to face the fact that the body itself must be given time to build up sufficient immunity to overcome the infection, and that in the meantime the symptoms must be treated as they arise, with the routine and conventional dosage schedule. They must console themselves with the fact that the prognosis in this type of malaria is good for eventual recovery whether with or without treatment, and in the absence of reinfection (or more accurately, superinfection) the body will gradually build up immunity against vivax and quartan infections to the point where, with very rare exceptions, they will be eradicated in the course of three (vivax) to six (quartan) years. This seems a long time, but most cases fade out before these limits, and even in those which linger longest, cooperation and vigilance on the part of patient and physician can largely prevent a measurable morbidity and loss of time.

"How Does P. Falciparum Kill? The answer to this question is not far to seek, though the actual mechanism is not known. Falciparum parasites cause the red cells to stick to each other and to the walls of the capillaries, so that the normally smooth flow of the blood is interrupted. Not only are the parasitized corpuscles sticky, but also the uninfected red cells, the leukocytes and the

endothelial lining. Consequently, the capillaries of vital organs become choked with thrombi thus formed, vessels rupture, infarcts occur, and irreversible damage results when such tissues as the brain are involved. Falciparum therefore kills not because of some powerful toxin or metabolic disorganization, but by causing agglutination of the red cells. It is mechanical obstruction and apoplexy of some vital blood vessel which causes death in malignant malaria.

"This fact has been known for some time, but visual evidence has been recently produced by Knisely and others. They describe the red blood corpuscles of rhesus monkeys infected with knowlesi malaria and canaries infected with an avian plasmodium, as forming clumps which grow progressively greater until the blood resembles sludge or even paste. The final picture shows clumps of erythrocytes clinging to the capillary walls, and there is leakage of plasma, increasing viscosity of the blood, retardation of blood flow, production of numerous thromboses, and finally death of the bird from ischemia or anoxia of vital areas. Obviously, similar phenomena could be observed in the cerebral capillaries of man were it possible to inspect them during the terminal hours of a falciparum infection of the brain; for the microscopical picture after death is congestion, block and rupture, with formation of thrombi composed of both parasitized and nonparasitized cells.

"Why vivax and quartan infections never cause agglutinative block like their more dangerous relative is not known; nor is it known why a falciparum infection which will carry on for days, weeks and even months, with and without symptoms, and with varying numbers of parasites circulating in the blood, without showing any clinical sign of this agglutinative tendency of the erythrocytes, will then suddenly within a few hours precipitate a grave state of vascular thrombosis in some vital organ. We do not know what acts as the trigger or initiating mechanism, or what relation the event has to agglutinins, agglutinogens and the physicochemical properties of the red cells. Paradoxically, clumping is less likely to be precipitated in the old case of malaria which has had poor treatment and developed good tolerance, than in the more recently acquired case which, though it has been treated well, has not had enough of the infection to develop a good state of tolerance." (Quoted from "The Malaria Problem" by Lt. Comdr. E.H. Hudson, (MC), USNR, M.Clin. North America, Sept. '43.)

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Cold Autohemagglutinins Following Atypical Pneumonia Producing the Clinical Picture of Acrocyanosis: Helwig and Freis have reported the occurrence of acrocyanosis presumably produced by cold autohemagglutination in a patient convalescent from an episode of primary atypical pneumonia. On exposure to cold the nose, ears and hands would become a deep purple. The discoloration, however, would disappear about 15 minutes after return to room temperature.

Capillaroscopy was made of the nailfolds of the patient's fingers. It was found that the capillaries reacted more or less normally to considerable variations in temperature, except for moderate ballooning of the summits of the loops when the hand was cyanotic. Not all capillaries in the field showed this phenomenon, which was interpreted as being due to reversible intravascular autoagglutination. Thermocouple readings of hand skin temperatures before, during and after chilling varied but slightly from similar readings on normal controls. When an attempt was made to do a routine red cell count on the patient with the diluting fluid at room temperature, prompt agglutination of massive character took place in the hemocytometer pipet. However, when the diluting fluid was warmed a little above body temperature, the agglutination was found to be completely reversible and a smooth, even suspension of red cells was obtained. Moreover, prompt agglutination could be produced again and again in hanging drop suspensions by alternate warming and chilling. The patient's blood was of group "O". When the serum was separated from the clot, it had the property of agglutinating not only the patient's own washed red cells but also the washed cells of normal group "O" persons. After repeated chilling of the patient on numerous occasions, no hemoglobin was found at any time in his urine. Furthermore, the "acid hemolysis test" for exclusion of paroxysmal hemoglobinuria was negative. The complete "acid hemolysis test" as described by Ham was carried out with the patient's red cells and the red cells of a known normal control with identical results.

The autoagglutinins were readily absorbable by the patient's own red cells and by red cells of normal group "O" persons. The autoagglutinins were active in dilutions up to 1:5,000. Moreover, these autoagglutinins could be recovered in saline solution from the washed agglutinated red cell masses and were found to be active again for group "O" red cells. (J.A.M.A., Nov. 6, '43.)

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(For general discussion of the subject of cold agglutinins in primary atypical pneumonia, see abstract of paper by Turner in the Bumed News Letter, September 17, 1943.)

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Wound Healing: Localio, Casale and Hinton have contributed to Surgery, Gynecology and Obstetrics a series of five papers on wound healing. Parts III, IV and V appeared in the September, October and November issues. Parts I and II are appearing in the International Abstract of Surgery of November and December.

In Part I, following an excellent review of the mechanism of wound repair, the authors discuss some of the processes which influence healing. The following are a few excerpts from this part of the paper:

"Hypoproteinemia: In 1938, Thompson, Ravdin and Frank showed that the hypoproteinemic dog is incapable of normal fibroplasia. Seventy-five per cent of the dogs in this study showed failure of wound healing and disruption of the wound. Fibroblasts did not appear until the seventh day. The results observed by these workers could be obviated by increasing the serum proteins to normal.

"Hinton and Localio have maintained rats on a protein-free diet for five weeks, during which time the plasma proteins were reduced 50 per cent. The lag period and period of final healing were prolonged in these animals, but disruption did not occur.

"Vitamin C: The pathological changes resulting from vitamin C deficiency occur in cells of mesodermal origin. The intercellular substances affected are the collagen of fibrous tissues, matrices of bone, dentine and cartilage, and the nonepithelial cementing substances, including vascular endothelium. The reparative and proliferative power of epithelial cells, endothelium, and fibroblasts is not affected. Jeney and Toro have shown that in fibroblast explants, collagen fibrils increase markedly following the addition of cevitamic acid to the culture media. Lanman and Ingalls have applied these findings to a study of the tensile strength of wounds of scorbutic animals, and found that the increase of wound strength during the proliferative phase was markedly retarded. They suggested further that vitamin C deficiency might be a factor in wound disruptions. These results have been confirmed by Taffel and Harvey. By utilizing the well-known affinity of precollagen for silver stains, Hunt has shown that precollagen devoid of holding power is the variety laid down in scorbutic animals, and that collagen of a normally-healed wound reverts to precollagen if scurvy supervenes. Lund and Crandon, in a like experiment performed on one of the authors, showed that after three months on a diet free from vitamin C a wound could heal normally. After six months on the same diet a typical scorbutic wound was obtained. Clinical scurvy was not apparent until the fifth month. This study shows that the vitamin C deficiency must be of long duration before wound healing is impaired.

"Trauma: When the surgeon leaves traumatized and devitalized tissue in his wake because of rough handling, mass ligation, undue retraction, crushing of tissue with large instruments, and forceful blunt dissection, numerous islands of necrosis occur. The necrotic tissue will have to be destroyed, and therefore the phases of destruction and lag period will be prolonged and the proliferative phase and final wound healing retarded. The processes of autolysis and heterolysis must be more active and larger numbers of migratory cells are required to debride the wound. Defects within the wound due to the death of tissue must be repaired by granulation, and therefore the process of healing must be more intense and widespread. As a consequence, the patient exhibits a febrile reaction, serum production in the wound is excessive, and islands of necrotic tissue in a lake of plasma afford a favorable environment for the proliferation of bacteria which are present in all wounds.

"Blood Supply: Restriction of the blood supply to any wound, due either to trauma or unwise ligation of the blood vessels, affects wounds as much as does trauma alone. The devascularized areas must become necrotic and destroyed, and absorbed or extruded.

"Chemicals: The use of chemicals for antisepsis should be limited. Most chemicals capable of destroying bacteria also destroy tissue.

"Electrosurgery: Ellis, Magyary and Hauberisser have shown that after electrosurgery, or electrocoagulation for hemostasis, the destructive phase is prolonged and wound healing is delayed. Fibroplasia is withheld until the necrobiotic zone produced by the current is removed.

"Suturing: Suturing under tension or with undue tension causes necrosis along the suture line with results similar to those just described.

"Foreign Bodies: The use of unnecessarily large drains and of excessive amounts of large-calibered suture material prolongs the lag period and delays fibroplasia, possibly causing suppuration. Foreign bodies must be absorbed, encapsulated or extruded.

"Inadequate apposition: In case of inadequate apposition, dead space must be filled in by granulation. This phase of healing is therefore prolonged.

"Infection: Although the days of "laudable pus" have passed, Meleney has shown that, unless infinite care is exercised, infection occurs in from 10 to 15 per cent of all clean wounds. He estimates that from 35,000 to 60,000 bacteria fall upon a sterile field during the course of a one-hour operation. He points out that contamination is usually air-borne and consequent to inadequate masking, dust traps, air currents, street clothing and the absence of canopies. Hart and his co-workers have attempted to combat this air-borne contamination by exposing the wound to ultraviolet radiation. Devonish and Miles discuss the relationship of glove puncture during operation to postoperative wound infection. These authors have shown the incidence of glove puncture to be as high as 24 per cent. Ives and Hirshfeld have shown that at operation all clean wounds are extensively contaminated with bacteria.

"Obviously, a large percentage of clean surgical wounds become contaminated, and in accidental wounds the percentage is probably higher and the number of contaminating organisms greater. Mason, Whipple, Maes and others have stressed the fact that the healthy wound can successfully exterminate bacteria, but a wound containing old blood, serum and devitalized tissue becomes an admirable culture medium for bacteria.

"The problem of the prevention of wound infection is related, therefore, not only to asepsis but also to the mechanism of surgical technic.

"Immobilization and rest: Mason has stated that motion during the lag period of wound healing disrupts the fibrin bridge and prolongs the lag period. During the proliferative phase motion may stretch the newly-forming scar, with resultant weakening of the delicate new tissues."

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VITAMINS	Equivalents				Approx. Daily Requirements*	
	U.S.P. XI Units	Internat. Units	Sherman Units	Mg.	Mg.	Internat. Units
Vitamin A	1	1	1.3	0.0003	1.5	5000
β-Carotene		1		0.0006	3.0	
Thiamine (B_1)	1	1	2.5	0.003	1.8	600
Riboflavin			1	0.004	2.7	
Nicotinic Acid					18.0	
Ascorbic Acid (C)	1	1	0.1	0.05	75.0	1500
Microcrystalline Vitamin D	1	1		0.000025	0.01	400
Irradiated Ergosterol		1		1.0	400.00	400

*Approximate Daily Requirements of Vitamins for an Adult (moderately active, 70 kilogram man) as recommended by the Food and Nutrition Board, National Research Council.

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The Biosynthesis of Thiamine in Man: Najjar and Holt have found that thiamine can be synthesized by bacterial action in the intestinal tract of man. It had been previously known that thiamine was manufactured by intestinal bacteria in the rat and some ruminants under certain conditions. Nine young men on synthetic vitamin-free diets supplemented by known amounts of vitamin were subjected to gradual vitamin B_1 deprivation.

Reduction below 0.4 to 0.6 mg. per day lowered the urinary excretion of thiamine to from 15 to 25 micrograms a day. This urinary excretion remained fairly constant even on complete withdrawal of the vitamin. Some weeks after complete exclusion of thiamine from the diet four of the subjects developed anorexia, vomiting, neuritis and edema. One developed anorexia and vomiting only, and the other four showed no signs of deficiency over a period of several weeks.

Examination of the stools revealed large quantities of thiamine in the stools of the four symptom-free subjects, moderate amounts in the borderline subject, and almost none in the four who were having symptoms.

The diet was checked and found to be free of thiamine. The possibility that the thiamine in the stool could be the result of excretion into the intestine was

disproved by failure to raise the quantity of thiamine in the stool by daily intravenous injection of 50 mg. in one subject. To prove that thiamine could be absorbed from the large intestine, retention enemata containing 50 mg. of the vitamin were given to two persons on successive days, and both had pronounced rises in urinary thiamine secretion.

In order to obtain direct evidence of the production of thiamine by the intestinal bacteria in these subjects, one of the symptom-free individuals was given by mouth 1.5 Gm. of succinylsulfathiazole every 4 hours for one week. The fecal thiamine fell promptly to zero. The possibilities that the succinylsulfathiazole might directly destroy thiamine or interfere with thiamine determination were explored and ruled out.

The authors state that this phenomenon may explain the discrepancy of thiamine requirements in man found by different observers and suggest the possibility of controlling thiamine deficiency by means other than thiamine administration. Also they point out the fact that the inhibition of the biosynthesis of thiamine by a sulfonamide has an important clinical application for the physician who uses these drugs. (J.A.M.A., Nov. 13, '43.)

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No Deleterious Effect on Suprarenal Glands of Pilots Subjected to Repeated Exposure to Reduced Atmospheric Pressure: Experiments using animals indicated that repeated short exposures to reduced atmospheric pressure were followed by an increase in the weight of the adrenal glands, a decrease in the weight of the thymus gland, an increase in the red blood cell count, hemoglobin content and hematocrit values, and an increase in the weight and size of the heart.

Clinton and Thorn have studied a group of 21 civilian airline pilots. Men were selected who had long experience in flying, many of them being accustomed to fly at altitudes considerably above 10,000 feet without supplementary oxygen. At the time of the study these pilots were flying eighty hours a month.

No conclusive evidence was encountered of alterations in adrenal function as measured by chemical analyses of the blood, measurement of the urinary sodium and chloride excretion during a period of salt deprivation and standard potassium intake (Wilder test), intravenous dextrose tolerance tests and determination of the excretion of 17 ketosteroids. Neither was there evidence of compensatory polycythemia or cardiac enlargement. (War Med., Oct. '43.)

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A Resume of Recent Studies on the Toxicity of Atabrine: Pharmacological studies on the toxicity of atabrine in animals have supplied additional information which may be of value in the interpretation of clinical reactions in the field.

While some of the work is as yet incomplete, nevertheless the importance of this drug in all military fields demands an immediate widespread dissemination of those findings which are established with reasonable certainty.

Atabrine, if given to dogs in a dosage sufficient to produce a plasma level of 1,000 micrograms per liter for a period of three months, will produce liver necrosis. The usual suppressive dosage in man of 300 to 600 mg. per week results in plasma levels of 15 to 20 micrograms per liter. The usual therapeutic regime (300 mg. per day) results in an average plasma level of 50 micrograms per liter. From this it is clear that a dosage sufficient to produce hepatic damage is probably 40 times the present suppressive dose and 10 times the present therapeutic dose. Since liver necrosis in animals develops only after several months, the safety factor is probably even greater.

Molitor has shown that the toxicity of atabrine is not increased by the simultaneous administration of sulfathiazole, sulfadiazine, sulfanilamide, alcohol or chloroform. When large doses of quinine are given with doses of atabrine sufficient to damage the liver, an increase in the hepatic necrosis results. In animals a low protein or a synthetic diet appears slightly to enhance the toxic effect of atabrine. No known single vitamin supplement will prevent liver intoxication when sufficiently high blood levels of atabrine are maintained for a long enough time.

Shannon and Brodie have shown that the atabrine content of the white blood cells is 400 times that of the plasma. Whole blood determinations of atabrine are hence markedly influenced by an increase in leukocytes and are not so accurate as plasma level determinations.

In animals chronically intoxicated with atabrine a neutrophilic leukocytosis usually occurs, and when they are sacrificed, the autopsy will frequently show one or more of the following findings: Hyperplasia of the omentum with adherence of the omentum to the stomach and intestines, atrophy of the spleen, focal necrosis of the myocardium and striated muscle, spontaneous thrombi in the hepatic veins and left atrium and central necrosis of the liver.

Both Geiling and Calvary have given dogs atabrine for periods of 40 to 65 weeks at a dosage of 35 mg./kg./week. Liver biopsies on these dogs have shown the liver to be normal and liver function tests have all been normal. The dogs have raised normal litters and no deleterious effect could be noted during the gestational period. At weaning the puppies were placed on the same per kilogram atabrine dosage as the adult dogs and they grew normally. It is not always safe to assume that the per kilogram dose with respect to toxicity is the same in man as in an experimental animal. However, a 35 mg./kg./week dosage in the case of a 70 kilogram man would amount to 2.0 Gm. per week.

In view of these findings it can be concluded that the present suppressive and therapeutic dosages, while they may give rise to some subjective symptoms, are nevertheless well below the toxic dose. (C.C.P.)

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The following are abstracts of some of the papers presented at the American Human Serum Association's Meeting in Philadelphia, October 22, 1943:

Experiences with Concentrated Human Serum Albumin in the Treatment of Shock and Hypoproteinemia: Janeway, Newhouser et al (Harvard and Naval Medical Schools). The physicochemical and physiological experiments which determined the size of the Standard Army and Navy Unit (25 Gm.) were presented as well as selected cases of traumatic shock, burn, cirrhosis, and nephrosis treated with albumin. Human serum albumin was shown to be safe, effective (in absence of marked dehydration) and convenient. It has been helpful in managing some patients with cirrhosis and nephrosis, but in these conditions much larger doses were required than had been expected.

Development of a 500 c.c. Package of Plasma for the Army and Navy: Kendrick (Army Medical Center). Using a box only 2 inches longer than the present dried plasma package, eighteen 500 c.c. plasma packages can be shipped in the space required for twenty-four 250 c.c. packages. The former, however, contain plasma equivalent to 36 small-size packages. The new size, then, saves 33 per cent in shipping space and 50 per cent in equipment (stoppers, needles, tubing, etc.) Five hundred c.c. can be given in 11 minutes. The empty water bottle can, with the addition of citrate and beads, be used as a transfusion set for whole blood. A new wire mesh is used instead of the glass cloth filter. It was proposed that 500 c.c. be made the official plasma unit to agree with albumin and whole blood.

This proposal was not accepted favorably by members of the Association. It would seem to be advisable to think in terms of the needs of the patient rather than in terms of "units". (L.R.N.)

Room Temperature Technic for Preparation of Plasma: Elliott (Army Medical Center). In a series of 76 pools comparative samples kept at room temperature and in refrigerators showed no difference in hemoglobin content, chemistry or sterility over long periods. Refrigerated plasma had a much greater fibrin precipitation. The use of dextrose in 5 per cent concentration and 10 per cent dilution of volume was thought necessary to prevent formation of a green color. (There is some evidence that merthiolate and light may be factors in the development of the green color. (L.R.N.))

Safe, Whole Blood in Military Use: Hicks (Naval Hospital, San Diego). In this large establishment where 600 to 1400 patients may arrive in a day, often

requiring that 100 to 150 blood transfusions be given in 24 hours' time, a special technic for transfusion was developed. Only group "O" blood is drawn into a bottle containing 2.5 Gm. sodium citrate, 1.25 Gm. sodium sulfathiazole and 0.5 Gm. merthiolate. Since 30 to 40 per cent of "O" bloods routinely have high isoagglutinin titers, 10 bleedings are pooled, then dispensed into separate 500 c.c. containers. These are administered without cross-matching by corpsmen and nurses using positive pressure. Some 50,000 transfusions have been successfully given in this way. One patient received 38 such transfusions in 40 days.

Studies on Chemical and Physical Chemical Changes Occurring in Liquid Plasma During Second Year of Storage: Lozner (National Naval Medical Center). Urea nitrogen remained essentially unchanged. Amino acid nitrogen, NPN and residual nitrogen all increased. Only the increase in amino acid nitrogen seemed to vary directly with the age, increasing from 5 mg. per cent initially to 12 mg. per cent in 2 years. Lozner recommends extending the dating period on liquid plasma (when its labile constituents are not needed) from one year to two years.

The Usefulness of the Intravenous Injection of Resuspended Red Cells After the Plasma has been Removed: Cooksey (Detroit). A total of 7,864 bottles of red blood cells resuspended in saline after plasma separation have been given and 4,050 of these injections have been analyzed. Of 200 injections studied only 1 produced jaundice, but jaundice followed the administration of whole blood also in the same patient. In 139 patients receiving both whole blood and red blood cell suspensions chills and fever occurred in 9 of 413 red blood cell injections (2.2 per cent) and 12 of 342 whole blood transfusions (3.5 per cent). Satisfactory elevation of red blood count and hemoglobin followed red blood cell transfusions. Suspension in Denstedt's or Alsever's solutions increased the useful life of cells from 6 to 18 or more days. Both type specific and "O" cells were used. Dr. John Gibson reported in discussion that 5 days after transfusions of red blood cells from donors fed ferric ammonium citrate containing radioactive iron, 20 per cent of the radioactive iron was incorporated in new red blood cells and constituted two-thirds of the hemoglobin of those cells. It was suggested that red blood cells be kept with an excess of oxygen in the bottle. Contamination could then be easily detected, because the red blood cells would turn dark if bacteria used up the excess oxygen.

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Chemical Desalinization Superior to Solar Distillation: The apparatus for demineralization of water in lifeboats and rafts has now been thoroughly tested and is in procurement. In recent tests at the Naval Medical Research Institute the efficiency of this method was compared with that of the Sunstill.

The Sunstill produced at best an average of no more than 500 c.c. of water daily. Nine days would therefore have to elapse before it would, under optimum weather conditions, make a volume of water equal to its own volume when folded.

In the same volume (4,400 c.c.) occupied by the Sunstill can be stored either ten cans of standard Army-Navy canned water containing 3,400 c.c. or a Decalso (Permutit) chemical kit capable of producing 19,800 c.c. of demineralized water.

The weight of the unpackaged Sunstill is 730 grams, equivalent to that of packaged chemicals producing 2,940 c.c. of potable water. The conclusions of the investigators are as follows:

No consideration need be given to the use of the Sunstill in rafts, such as the one-man parachute raft, in which its 4,400 c.c. or 268 cu. in. volume when folded renders it too bulky to be stowed.

In any case, a Sunstill should not be made standard equipment on Navy rafts without previous evaluation of its performance in sea trials during which men live with the stills on rafts for several days and nights. In earlier tests the efficiency of the Sunstill fell well below its efficiency when operated on land, where constant, exact orientation to the sun can be maintained.

Installation of an awning on rafts, as recommended by the Liaison Committee on Emergency Rescue Equipment, will interfere seriously with operation of a Sunstill. This fact militates against adoption of such a still for rafts. (From a report by P.H.F. of N.M.R.I. Project #24, "Test of Performance of An Improved Delano Sunstill on Land.")

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How to Remove the Taste of Super-Chlorinated Water: Complaints are frequently heard about the unpleasant taste of over-chlorinated water. It is wiser for medical officers to err on the side of safety in water chlorination. However, it is possible that dechlorination should be carried out more frequently than at present.

The following tables indicate the approximate amounts of 10 per cent sodium thiosulfate that is required to remove the taste of either chlorine or iodine from drinking water after these agents have been allowed to act for at least 30 minutes:

IODINE

Drops of Tincture of Iodine (7%) Used in Canteen	Drops of 10% Sodium Thiosulfate Required for Neutralization
2	3.0
3	4.0
4	5.5
5	6.5
6	8.0
7	9.0

CHLORINE

Parts per Million of Chlorine	Drops of 10% Sodium Thiosulfate Required Per Canteen	C.C. of 10% Sodium Thiosulfate Required per Lyster bag (36 gal. capacity)
1	3.5	10.07
2	7.0	20.13
3	10.5	24.00
4	14.0	40.26
5	18.0	50.33
6	21.0	59.39
7	24.5	70.46
8	28.0	80.52
9	31.5	90.59
10	35.0	100.66

(D.R.M. & A.M.S.)

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Collection and Identification of Specimens of Rats and Other Mammals: When identification of mammals is desirable, it is almost invariably necessary that there be access to a good museum collection and that the identification be made by an expert. The murine and other mammalian faunae in many parts of the world are imperfectly known, and it is therefore desirable that properly prepared specimens be collected, identified, and deposited in the collection of the U.S. National Museum where they can be used subsequently to aid in the identification of other specimens. Specimens deposited at the U.S. National Museum will also provide a permanent record of all investigations of mammals involved in the transmission of disease. The importance of a complete collection in identification, especially in insular regions, cannot be overemphasized.

Specimens should, whenever possible, be prepared in accordance with "Directions for Preparing Specimens of Mammals," compiled by the Division of Mammals, U.S. National Museum. Copies of these directions are being sent to all epidemiology and malariology teams and are available through BuMed to all other officers.

For proper identification the following are necessary: (a) the skin, (b) the skull, (c) a label attached to the skin giving number assigned to the specimen, sex, collecting locality, total length of animal, length of tail, and length of hind foot in accordance with the directions prepared by the U.S. National Museum. The name of the collector should be attached. Specimens should be packed carefully and the packages hermetically sealed using glue, gummed paper, or adhesive tape. All specimens should be sent to the Naval Medical School, Bethesda, Maryland, Attention: Dr. Remington Kellogg, Curator, Division of Mammals, U.S. National Museum. All such specimens should be marked "Skins of Mammals". When for reasons of security it is necessary to send data relative to collected specimens separately, care should be exercised to attach identical numbers to the skin, skull and data.

On receipt of the material, a list of the identified specimens will be forwarded to the collector as acknowledgment of receipt of the shipment. The identified specimens will be deposited in the collection of the U.S. National Museum which is available to personnel of the United States Navy for teaching and study purposes.

These instructions are in accordance with statutes requiring that all objects of natural history collected for the Government of the United States be deposited in the U.S. National Museum when no longer needed for investigations in progress. (T.J.C.)

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Night Flying Accidents and Autokinetic Movement: When a person is placed in a darkened room and instructed to stare at a single fixed point of light, he will soon report that the light has begun to move. The light will seem to swing through irregular arcs of considerable size. This phenomenon is known as autokinetic movement.

Steady visual fixation upon a small light source has been for many years a standard technic for inducing hypnosis. Subjects have found themselves staring fixedly at the light, watching it with dream-like fascination in which both contact with the environment and recollection of what they were trying to do were lost.

Flying in formation on an overcast night the wing man may be able to see nothing but the tail-light of his lead-pilot. Conditions are favorable for the production of both autokinetic movement of the image of the light and pre-hypnotic fascination on the part of the pilot.

This phenomenon may explain a certain type of accident in which a pilot is observed to break away from night formation, enter an all-out dive, and strike the water without any apparent attempted recovery from the dive.

Preventive measures should include: (1) Warning pilots of the existence of autokinetic movement, (2) instructing them to avoid long periods of continuous staring at the light ahead, and (3) possibly providing each plane with two tail-lights. (Abstracted from item by J.G.J. in the Aviation Supplement of the Bumed News Letter, Nov. 26, '43.)

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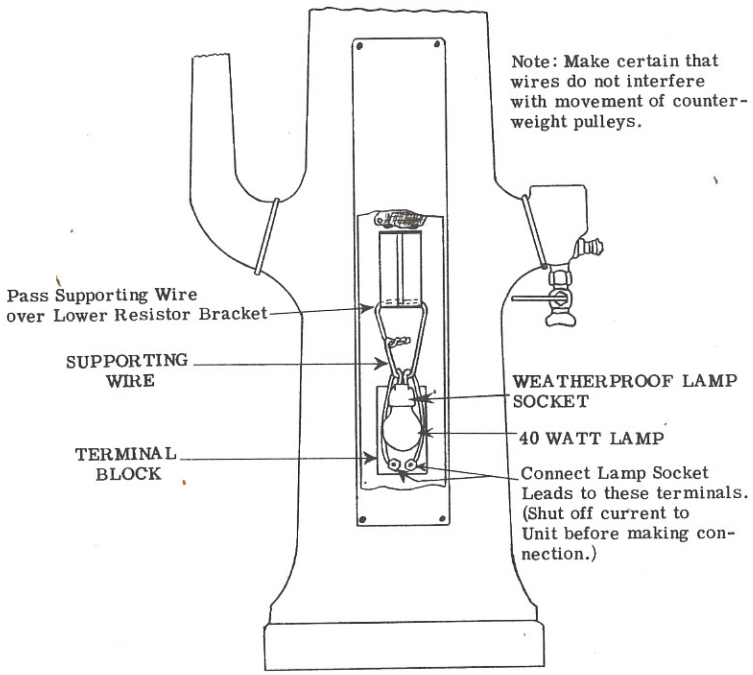
Prevention of Corrosion in Ritter Dental Operating Units: Reports of corrosion of electrical parts and rupture of cloth-reinforced rubber tubing due to moisture within the unit housing have been received. Usually the units involved are on the ground floor of an activity located in a humid climate; units on

the second floor of the same building are often unaffected. According to a communication from the Ritter Company, both mildew and corrosion may be prevented in Ritter units by installation of a 40-watt lamp as illustrated. Similar corrective measures may be improvised for other units. (C.F.L.)



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Destruction of Red Blood Cells in Burns: Shen, Ham and Fleming have recently published a combined clinical and experimental study of hemoglobinemia and hemoglobinuria in burns.

Gross hemoglobinuria was observed in nine cases and minimal hemoglobinuria in two among forty cases receiving combined second and third degree thermal burns involving 15 to 65 per cent of the body area. The maximum excretion of hemoglobin occurred during the first twelve to twenty-four hours, then decreased rapidly.

Urine samples from patients with gross hemoglobinuria were scanty in amount for one or two days, were acid and contained hemoglobin in solution, in precipitated form and in casts. The pigments were identified as oxyhemoglobin mixed with traces of methemoglobin. There was no evidence of myohemoglobin. The plasma or serum from eight cases showed hemoglobinemia.

Chronic azotemia of moderate severity occurred in spite of re-establishment of adequate excretion of urine in 4 of 5 patients with hemoglobinuria who lived five days or longer. In 6 patients with hemoglobinuria examined post mortem,

the histology of the kidneys was consistent with hemoglobinuria in each case. It is suggested that the immediate treatment of severely burned patients should be directed toward the establishment of a diuresis with an alkaline urine.

The authors found that if blood was rapidly heated to a temperature of 51 to 65° C., changes occurred in the red cells consisting of fragmentation and the formation of spherocytes and microspherocytes, with a striking increase in osmotic fragility and hemolysis of the erythrocytes.

In patients with severe or moderately severe thermal burns, the red cells examined promptly after the burn exhibited changes in morphology and osmotic fragility similar to those obtained by the injection into dogs of the animals' own erythrocytes heated in vitro to approximately 53° C.

Shen and his co-workers conclude that the increased osmotic fragility of heated red cells apparently results from conversion of the normal biconcave erythrocytes to more nearly spherical forms by a process of progressive fragmentation, but that the mechanism by which heat causes fragmentation of red cells is not defined. They suggest the possibility that destruction of the red cells with increased osmotic fragility in vitro occurs through a mechanism of swelling and osmotic hemolysis in the isotonic plasma of the animal.

They further conclude that in thermal burns a significant number of erythrocytes may be destroyed by heat, probably depending on the temperature attained by the blood, the duration of heating and the volume of blood subjected to these conditions. (New England J. Med., Nov. 4, '43.)

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Volunteers for Experimental Work, Appreciation of: It is suggested that where medical officers may be in charge of or connected with authorized investigations which involve the employment of volunteer personnel they express for the Navy Department to these men its cordial appreciation. Official Navy recognition of loyal service cheerfully performed may in many instances be difficult or impossible to accomplish.

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Research: The following instructional material has been communicated to certain Naval units and is here quoted as of general interest.

The Bureau of Medicine and Surgery assumes responsibility for all matters relating to medical research conducted in the Navy, - exchange of information, integration of effort, receipt of reports, and presentation of any recommendations which may issue therefrom.

The Bureau appreciates the initiative shown by the Low Pressure Chamber groups in the recognition, formulation and execution of research projects, and wishes to encourage its continuation insofar as is compatible with their primary mission. In order, however, to insure coordination of research projects and to avoid unnecessary duplication of effort, it is essential that this Bureau be informed of all research.

Accordingly, it is directed that all research projects, and all physiological tests of air equipment, regardless of their origin, which involve personnel or facilities of the Medical Department of the Navy be cleared through this Bureau.

If the appropriate clearance of a project with this Bureau is in doubt, it is directed that the project be started, and the Bureau readvised, the continuation of the project being then contingent upon clearance by this Bureau.

It is desirable that a project form be submitted.

Bridging the Gap between Development and Operational Use: Our part in research is not effectual until the results are in the hands of responsible action-officers. If we have merely submitted a report, we have no assurance as to what attention it received, or by whom. Since the recipient has no inkling as to the official views of the Bureau, action, although basically medical, is wholly dependent upon lay judgment.

As a means of remedying this situation, hereafter, if the findings issuing from a research project are deemed sound and properly grounds for action, they will be transcribed in the form of specific recommendations, and - supported by the pertinent report of research - forwarded to appropriate addressees over the signature of the Surgeon General.

For the reasons given above, reports will hereafter contain "conclusions" but no specific "recommendations."

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Public Health Foreign Report:

Disease	Place	Date	Number of Cases
Plague	Indochina, Cochinchina	Aug. 21-31, '43	2
	Madagascar	July 1-Aug. 19, '43	4 (2 fatal)
	Morocco (French)	August '43	6
Smallpox	Algeria	Sept. 1-10, '43	62
	Indochina	Aug. 21-31, '43	48
	Morocco	August '43	60

Public Health Foreign Report (cont.):

Disease	Place	Date	Number of Cases
Typhus Fever	Algeria	Sept. 1-10, '43	34
	Morocco	August '43	155
	Rumania	Sept. 24-30, '43	23
	Slovakia	Sept. 11-18, '43	12
Yellow Fever	Dahomey, Natitingou	August 28, '43	1 (suspected)

(Pub. Health Rep., Oct. 22, '43.)

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N.M.R.I. Research Project Reports Released by BuMed for the Month of October and Available to Medical Officers on Request to the Naval Medical Research Institute, Bethesda, Maryland:

X-180 Report #5. Proposed Navy Department Specifications 37-M-7b for Masks, Face, Winter N-1, Toxicity Tests for.

X-180 Report #6. Camouflage Ponchos, Toxicity Tests for.

X-180 Report #7. Material for Inner Support for a Helmet, Toxicity Test for.

X-180 Report #8. Proposed Navy Department Specifications for Cotton Cloth; Fire, Mildew and Weather Resistance, Toxicity Tests for.

X-162 Report #2. Determination of Effect on Dark Adaptation of Varying Intensities of Illumination in Ready Rooms: Newly Discovered Fluctuations of Periodic Nature Occurring in Dark Adaptation Thresholds.

X-169 Report #1. Vitamin Content of Naval Flight Rations as Affected by Their Method of Cooking.

X-119 Report #1. Testing of H 11 RD Goggle for Fogging under Certain Conditions.

NMRI-24 Laboratory Testing of "Sunstill" (Delano Process).

The Status as Described in the October Report of Some of the Research Projects Being Conducted at the Naval Medical Research Institute is as follows:

Project X-191. "Application of Body Fat Measurements to the Study of 'Bends'-Susceptibility." A series of volunteer subjects is being studied in the laboratory by means of a battery of tests. They are also being classified as to 'bends'-susceptibility at weekly intervals by two-hour exposures at 38,000 feet, without undergoing pre-oxygenation.

Project X-165, "Control of Bacillary Dysentery and Cholera by Use of Bacteriophages." Additional pooled polyvalent dysentery bacteriophage has been prepared and approximately 7 liters of this pooled phage were concentrated as a preliminary step to lyophilization. Studies are continuing in order to obtain an optimum method for lyophilization. The present pooled bacteriophage has a high polyvalency and has been found to be active against every strain of true dysentery that has been tested.

Project X-189, "Protective Clothing for Subjects Immersed in Cold Water." Water-tight suits have been designed for seamen and for air crews in bombers. Field trials will shortly be conducted under the auspices of the Emergency Rescue Equipment Section.

Project X-133, "Uses of Tantalum in Surgery." Photomicrographs have been made showing the reaction of tissue to tantalum wire and other suture materials. Another post mortem study was made on an animal with a tantalum skull plate and a spinal fusion with tantalum. The results are encouraging.

Project X-182, "The Use of Lucite Calvarium for Observation of the Brain." A report is being prepared on the technic of lucite cranioplasty. Further studies are being made on these animals of the effects of high and low barometric pressure, pneumoencephalography, head trauma and drugs on the brain and cerebral vessels.

Project X-209, "Acute and Chronic Toxicity and Pharmacology of Dihydroquinine." Five monkeys are being given the drug orally and three monkeys are receiving quinine orally. The absorption and blood levels of these drugs are being studied. The results of acute toxicity studies will constitute Report #1. The chronic toxicity work on cats, rats and chicks is being continued.

Project X-222, "Studies in Typhus Fever." Epidemic and endemic typhus studies in yolk sac cultures are being continued. Both epidemic and endemic typhus have been established in animals. Scrub typhus has been initiated in yolk sacs and in animals.

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